



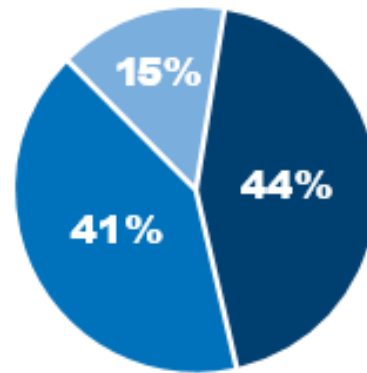
EPIC Program | Enabling a 100% Clean Energy Future

California Energy Commission

Accelerating Clean Energy Innovation

\$718
MILLION
AWARDED

TO
328
PROJECTS



2012-2020

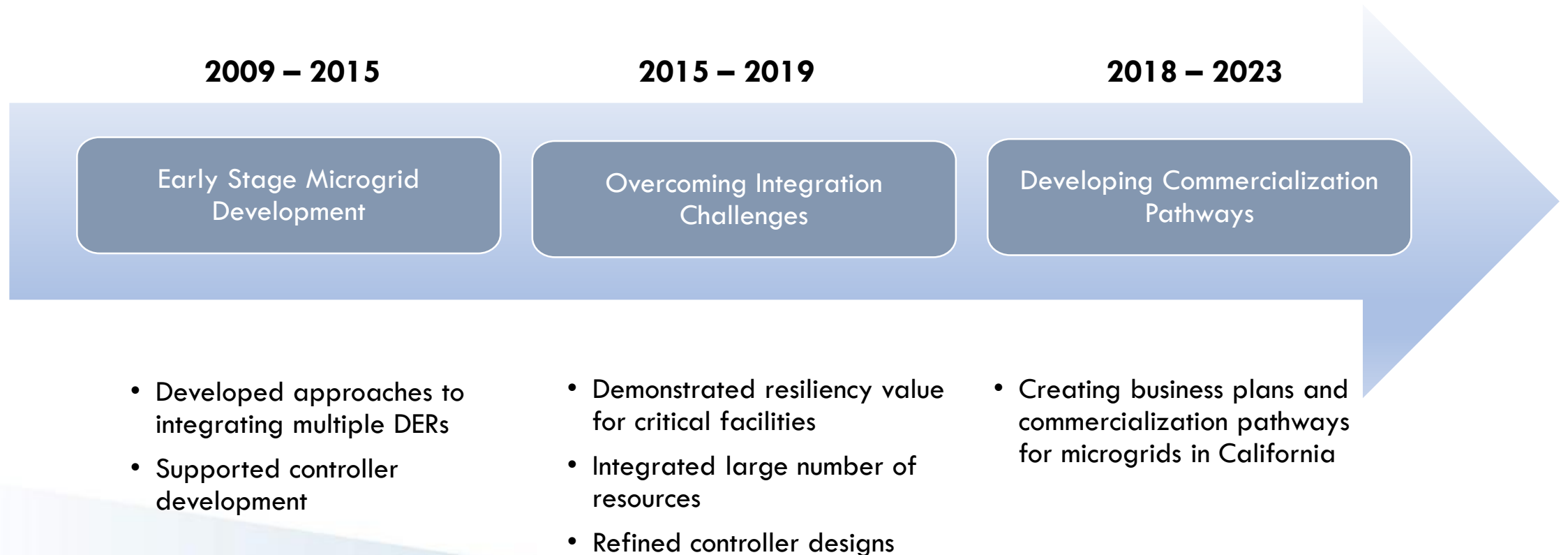
Funding Distribution by Area

- Applied Research & Development
- Technology Demonstrations & Development
- Market Facilitation



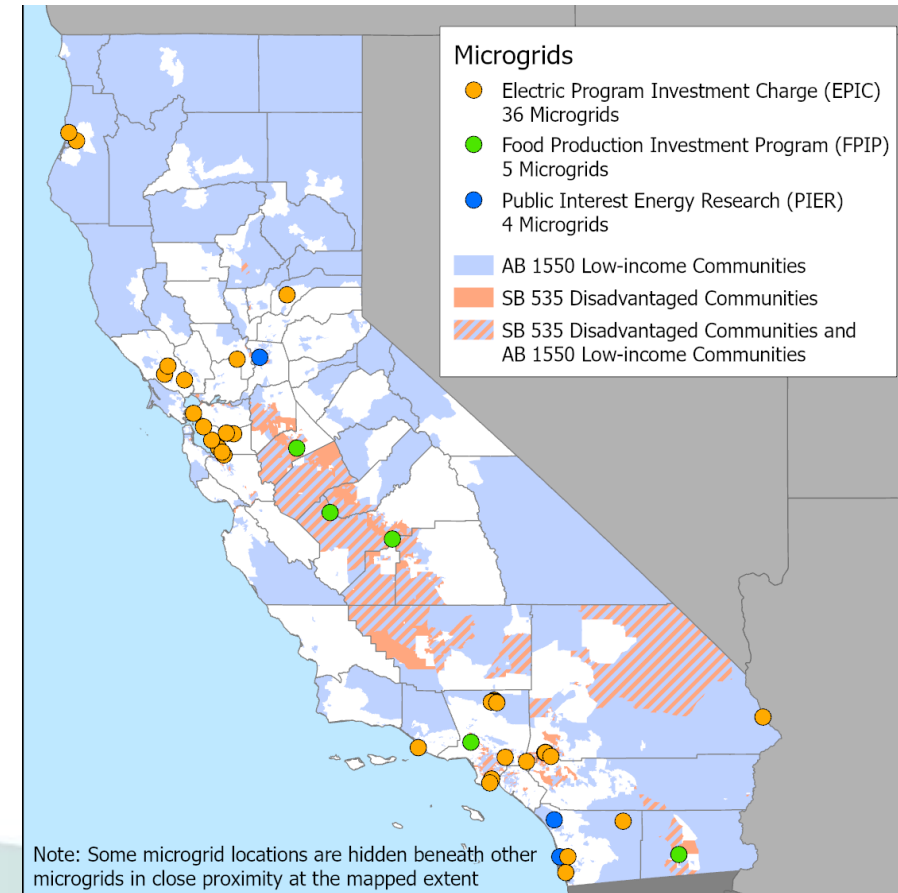
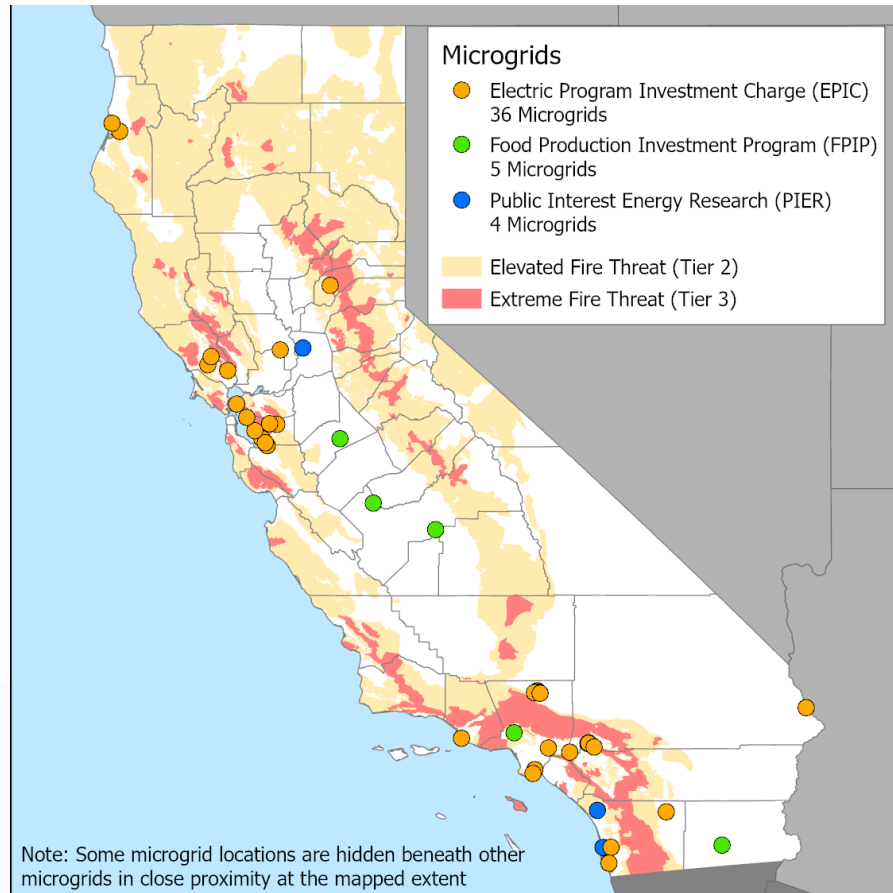


A Decade of Microgrid Research



Providing Critical Functions

34 microgrid projects - \$91M invested - \$75M match



A Diverse Portfolio

Microgrid Sizes*

Small (Under 1000 kW)

Public institutions
Commercial
Fire Stations
Hospital

Medium (1000 kW – 5000 kW)

Campus
Airports
Ports

Large (5000 kW – 20,000 kW)

Industrial
Utility/Community

AC Coupled

Configurations

DC Coupled



End User



3rd Party



Utility

*Total inverter size

A Diverse Portfolio

Critical Facilities



Shelter



Medical Center



Fire Stations



City Hall, Police HQ, and
Community Centers



Waste Water Treatment Plant



Airport

Ports



Military



Communities



Industrial



Digester



Distribution Center

Community Microgrid at Blue Lake Rancheria

Microgrid Design

Solar: 420 kW AC PV ground-mounted array

Energy Storage: 500 kW / 950 kWh lithium-ion battery storage

Software & Controls: Siemens Spectrum Power 7 Microgrid Management System and Schweitzer Engineering Laboratories Protection Relays

Other Infrastructure: Purchased distribution system infrastructure to create a new point of common coupling with the grid, integrating six buildings into the microgrid behind one electric meter

Technology Integration: The Schatz Energy Research Center at Humboldt State University



UNIQUE PROJECT ASPECTS

- ✓ American Red Cross shelter
- ✓ Successfully islanded during several unplanned utility outages due to weather and nearby wildfires
- ✓ Can deploy five levels of load shedding depending on the outage and system conditions
- ✓ Achieving cost savings: 58% overall energy

Emergency Microgrids for Fire Stations

Microgrid Design

Solar: 38 kW solar PV at Fire Station 11, 43 kW each at Fire Stations 6 and 7

Energy Storage: 110 kWh li-ion battery storage at each

Software & Controls: Gridscape Solutions' cloud-based predictive distributed energy resource management software (DERMS) and energy management system – EnergyScope

Technology Integration: Gridscape Solutions



UNIQUE PROJECT ASPECTS

- ✓ Displaces diesel generation and extends fuel reserves in emergency, keeping the fire station online longer as a viable first responder
- ✓ System design refined over deployments.
- ✓ Demonstrated more than 10 hours of islanding capability
- ✓ Gridscape expanding to other communities

GRIDSCAPE



Redwood Coast Airport Microgrid

Humboldt State University

- Collaborative design and operation
 - RCEA – 2.2MW PV & 2.2MW/8.8 MWh storage (CAISO participation) & 320 KW PV (reduces airport electricity bill)
 - PG&E – FTM microgrid
- Community-scale system – multiple customers, including USCG Air Station
- Create experimental tariffs/agreements for fair allocation of costs & compensation of third party generator
- Participate in CAISO wholesale market
- Create a replicable business model



CEC: \$5M

Match: \$6.3M



REDWOOD COAST
EnergyAuthority

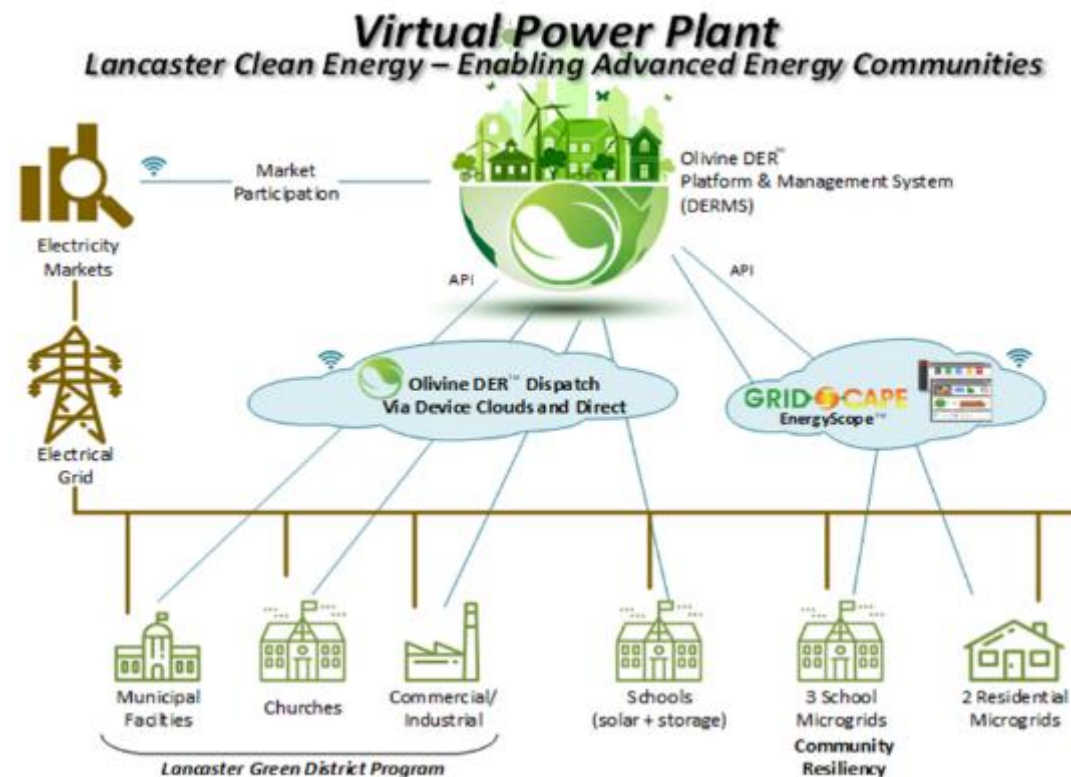


SCHATZ
ENERGY
RESEARCH
CENTER

Lancaster Advanced Energy Community

Zero Net Energy (ZNE) Alliance

- Developing a virtual power plant of connected DERs
 - 5 MW PV & 10 MWh storage
- 2 ZNE affordable housing developments
 - 70 unit – 780 KWh Li-ion
 - 164 unit – 500 KWh flywheel
- 3 school microgrids
- Partner with Lancaster Green District to deploy more BTM storage



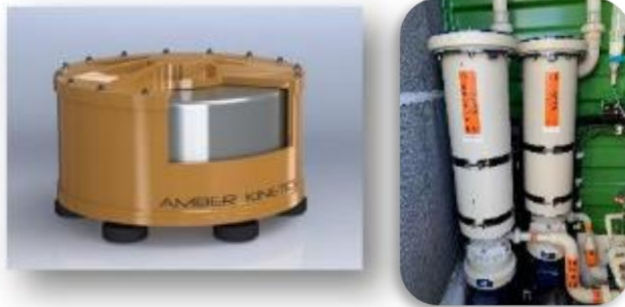
CEC: \$5.0M

Match: \$5.7M

Energy Storage Research – A Critical Microgrid Enabler



Diversify



Eos Aurora 1000 | 6000
Grid-Scale Energy Storage



Demonstrate



Derisk*



*Lower manufacturing costs

Policy Efforts for Microgrid Commercialization

- Senate Bill 1339 (2018) requires CPUC to:
 - *“take action to help transition the microgrid from its current status as a promising emerging technology solution to a successful, cost-effective, safe, and reliable commercial product that helps California meet its future energy goals and provides end-use electricity customers new ways to manage their individual energy needs”*
- Rulemaking Proceeding R.19-09-009
 - Track 1: Short-term actions focused on PSPS support (complete)
 - Track 2: Evaluating rule changes and tariff options (in progress)
 - Track 3: Ongoing collaboration and future resiliency planning



Questions

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